CELRC-ED-HE 19 Feb 1999

ANNUAL REPORT

Water Quality Management Program
U.S. Army Corps of Engineers
Chicago District

1. Purpose: This annual report summarizes the water quality activities of the Chicago District for fiscal year 1998.

2. References:

a. CELRD-GL-E-EW memorandum, subject: Annual Reports on Water Control and Water Quality, 24 October 1997.

b. ER 1110-2-8154, subject: Water Quality and Environmental Management at Corps Civil Works Facilities, 31 May 1995.

c. NCDR 1110-2-23, subject: Water Control Management, Water Quality, 7 June 1982.

d. ER 1110-2-4001, Notes on Sedimentation Activities, 12 November 1981.

e. Position Paper, subject: Duties and Responsibilities of the District Water Quality Coordinator, 12 April 1977

f. "Chicagoland Underflow Plan, McCook Reservoir, Special Re-Evaluation Report and Final Environmental Impact Statement," U.S. Army Corps of Engineers, Chicago District, September, 1998.

g. "Contaminant Determination for Waukegan Harbor Advance Maintenance and Approach Channel Dredging and Open Water Disposal," U.S. Army Corps of Engineers, Chicago District, January, 1998.

h. "City of Chicago Phase II Environmental Site Assessment – Calumet Avenue and Taylor Street," U.S. Army Corps of Engineers, Chicago District, September, 1997.

i. "Water Quality Management Program, Water Quality Activities of the Chicago District," U.S. Army Corps of Engineers, Chicago District, November, 1997.

3. Water Quality Management Program:

a. Organization: The Environmental Engineering Section of the Hydraulic and Environmental Engineering Branch, Engineering Division (CELRC-ED-HE) is responsible for the Chicago District's Water Quality Management Program. The members of the program in FY 1998 were the following:

Jay Semmler	Environmental Engineer, GS-13 Section Chief District Water Quality Coordinator District Sediment Quality Coordinator
Michael Neeley	Environmental Engineer, GS-11 Alternate District Water Quality Coordinator
Linda Sorn	Environmental Engineer, GS-12
Kirston Buczak	Environmental Engineer, GS-12
Sharon Force	Environmental Engineer, GS-11
Allen Lee	Environmental Engineer, GS-11
Johnna Potthoff	Environmental Engineer, GS-11
Elaine Taylor	Environmental Engineer, GS-11
Ajit Vaidya	Environmental Engineer, GS-11
John Yagecic	Environmental Engineer, GS-12
Ana Kewes	Industrial Hygienist, GS-11
Baldemar Corral	Hydraulic Technician, GS-04
Tom Patton	Hydraulic Technician, GS-04
Dr. Philip B. Moy	Fisheries Biologist, GS-12
Steve Hungness	Civil Engineer, GS-13

Dr. Philip Moy (Environmental and Social Analysis Branch) is the Planning Division Water Quality Management Committee Member. Steve Hungness (Civil Engineer, Chief, Operations Technical Support Branch) is the Construction Operation Division Water Quality Management Committee Member.

b. Program Status: The District Water Quality Management Plan is outlined in a Position Paper (reference e), dated 1977. It is not a district regulation. The Environmental Engineering Section is responsible for performing and coordinating the activities of the Water Quality Management Program in accordance with NCDR 1110-2-23 dated 7 June 1982 and ER 1110-2-8154 dated 31 May 1995. The water quality coordinator is an assigned member of the Hydraulic and Environmental Engineering Branch**.**

The District Water Quality and Environmental Management Program workload is steady. Eleven full time employees are authorized. During fiscal year 1998, the Environmental Engineering section staff size was ten environmental engineers and one industrial hygienist.

c. Training: Program Environmental Engineers attended the following training in FY 1998:

COURSE	GIVEN BY	DATES
Architect/Engineer Contracting	PROSPECT	December 1-5, 1997
OSHA Hazardous Waste Site 8 hour Refresher Training	In House	February 5, 1998
CPR/First Aid Training	In House	February 11, 1998
Architect/Engineer Contracting	PROSPECT	February 23-27, 1998

COURSE	GIVEN BY	DATES
HTRW Environmental Regulatory Applications	PROSPECT	March 16-20, 1998
Lead contractor/supervisor refresher training	Moraine Valley Comm. College	March 26, 1998
Hazardous Waste Manifesting	PROSPECT	April 27 – May 1, 1998
Field Techniques Short Course	Northeastern Illinois U.	May 15, 1998
Water Quality '98	USACE	June 3-4, 1998
ASCE Joint Water Resources Planning & Mgmt/Nat'l Conference on Environmental Engineering	ASCE	June 8-10, 1998
Mac3D Model Training	WES	June 10-12, 1998
Asbestos refresher training	Moraine Valley Comm. College	June 25, 1998
Sediment Quality Guidelines Short Course	USEPA	November 3-4, 1998
Total Maximum Daily Loads Workshop for USACE	USEPA	November 12-13, 1998

Training is needed regarding environmental laws and regulations, groundwater investigations, environmental chemodynamics, environmental stormwater management, GIS and PROMIS. Continuing OSHA Hazardous Waste Site Worker 40 hour basic and eight (8) hour refresher training, lead abatement refresher training, and asbestos abatement refresher training are also needed. On-going training for changes/additions to the regulations, such as the Great Lakes Initiative, Total Maximum Daily Loads, and Sediment Quality Guidelines, are needed as required. Elaine Taylor served on a 4-month developmental assignment with the District's Planning Division, Kirston Buczak served on a 3-week developmental assignment on brownfields with USACE Headquarters, and Sharon Force served on a 7-month developmental assignment with the District's Civil Design Section. Elaine Taylor provided support to FEMA for 1) completing Disaster Survey Reports (for a local flood) in Athens County, Ohio for a 1-month period and 2) assisting in Hurricane Georges Disaster Relief for a 1-month period in Puerto Rico as a member of the Water Planning & Response Team.

d. Inter-Agency Coordination: Environmental Engineering Section Chief Jay Semmler sat on the committee with Indiana Department of Environmental Management and USEPA coordinating Indiana Harbor CDF issues, RCRA closure and correction action and TSCA issues at the Energy Cooperative, Inc. site. Jay Semmler and Linda Sorn attended the public meetings held for the Indiana Harbor and Canal Environmental Impact Statement. Ajit Vaidya was responsible for coordinating a meeting on the Waukegan Inner Harbor project with members of USEPA, Illinois EPA, IDNR, and Waukegan Citizens Advisory Group, and following up with letters to IEPA and USEPA requesting further guidance. Linda Sorn gave presentations at a) Vanderbilt University, Eckenfelder Environmental Engineering Series, b) Water Quality '98, a USACE conference, and c) ASCE Joint Water Resources Planning & Management/National Conference on Environmental Engineering. Linda Sorn is the NPDES Stormwater Permit Coordinator. Phil Moy, Fisheries Biologist, is a member of the Lake Michigan Reef Committee and serves as chairman of the Aquatic Nuisance Species Barrier Committee. Phil Moy gave presentations on the Aquatic Nuisance Species Barrier in the Sanitary Ship Canal for the Great Lakes panel, Aquatic Nuisance

Species task force, Zebra Mussel and Aquatic Nuisance Species Conference, American Society of Civil Engineers, Zebra Mussel Control Committee, New York Canal System Workshop, and various regulatory agencies. He also served on a recreational boating impacts panel at the Illinois Lake Management Association meeting.

e. Laboratory Monitoring: During FY 1998 sample analyses were performed by approved labs of the Missouri River Division or Illinois EPA through indefinite delivery contracts or competitive bidding of private labs. Labs performing work for the District included: ARDL of Mt. Vernon, Illinois; Great Lakes Analytical of Buffalo Grove, Illinois; and QST Environmental Inc. of Gainesville, Florida. Northwestern Division Laboratory (formerly Missouri River Division Laboratory) in Omaha, Nebraska, provided laboratory validation updates for the District in 1998.

Water sample collection was performed the Chicago District or by private firms through an indefinite delivery contract. The District collected sediment samples using core drilling equipment or clamshell bucket equipment supplied by private firms. The firm Maxim Technologies Inc. was contracted to provide indefinite delivery environmental engineering and chemical analysis services during 1998, 1999 and 2000.

f. Monitoring Summary:

WATER QUALITY MONITORING SUMMARY
Chicago District FY 1998

Project	State	Type	Stations	Parameter	Frequency
Chicago Area CDF Water Quality Monitoring	Illinois	Surface water Surface water Groundwater CDF water	6 Lake 3 Riverine 3 3 Other	Nutrients, metals	Three times/year
O'Hare Reservoir	Illinois	Groundwater	13	IL. Class I Groundwater Standards	Three times
McCook Reservoir	Illinois	Surface water (outfalls)	4	BOD, nutrients	Event-based
Waukegan Approach Channel	Illinois	Surface water	2 dredging	Nutrients, metals, PCBs, asbestos	Once
Indiana Harbor & Canal	Indiana	Groundwater	6	Treatability study for Indiana Harbor CDF	Once
Calumet Harbor, Chicago Harbor, Waukegan Harbor, Calumet River, and Lake Calumet	Illinois	Fisheries		D.O., pH, temp, secchi depth	Seasonally Spring Summer and Fall
Indiana Harbor, Michigan City Harbor and Trail Creek	Indiana	Fisheries		D.O., pH, temp, secchi depth	Seasonally Spring Summer and Fall

WATER QUALITY MONITORING SUMMARY
Chicago District Anticipated FY 1999

Project	State	Type	Stations	Parameter	Frequency
Chicago Area CDF	Illinois	Surface water Surface water Groundwater Other	6 Lake 3 Riverine 3 3 Other	Metals, nutrients	3 per year
CUP Thornton Reservoir	Illinois	Groundwater	5	IL. Class I Groundwater Stds.	Once
CUP McCook Reservoir	Illinois	Surface water (outflows)	4	BOD, nutrients	Event-based
CUP McCook Reservoir	Illinois	Groundwater	12	IL. Class I Groundwater Stds.	Once
Lake George	Indiana	Surface water	1	Ammonia, TSS	Once
Johns-Manville site	Illinois	Surface water Groundwater	3 3	Metals, nutrients	Once
Calumet Harbor, Chicago Harbor, Waukegan Harbor, Calumet River, and Lake Calumet	Illinois	Fisheries		D.O., pH, temp, secchi depth	Seasonally Spring Summer and Fall
Indiana Harbor, Michigan City Harbor and Trail Creek	Indiana	Fisheries		D.O., pH, temp, secchi depth	Seasonally Spring Summer and Fall

SEDIMENT QUALITY MONITORING SUMMARY
Chicago District FY 1998

Project	State	Type	Stations	Parameter	Frequency
Waukegan Approach Channel	Illinois	Sediment	3 dredging, 3 reference	PCBs, grain size, asbestos, elutriate for metals and nutrients	Once
Waukegan Inner Harbor	Illinois	Sediment	8 dredging 1 reference	PCBs, nutrients, metals, modified elutriate, settling test	Once
Indiana Harbor & Canal	Indiana	Sediment	5 dredging	Treatability study for Indiana Harbor CDF	Once
Little Calumet River Flood Control & Recreation	Indiana	Soil	7	TCLP	Once
Chicago Shoreline	Illinois	Sediment	3	Metals, pesticides, PAHs, nutrients, asbestos, grain size	Once

SEDIMENT QUALITY MONITORING SUMMARY
Chicago District Anticipated FY 1999

Project	State	Type	Stations	Parameter	Frequency
Lake George	Indiana	Sediment	9 dredging	Ammonia and modified elutriate for ammonia	Once
Waukegan Outer Harbor	Illinois	Sediment	3 dredging 3 reference	PCBs, grain size, asbestos	Once
Waukegan Inner Harbor	Illinois	Sediment	6	Leaching tests	Once
Johns-Manville property	Illinois	Sediment	3	Metals, nutrients, asbestos and leaching tests	Once
Grand Calumet River	Indiana	Sediment	60	PCBs, pesticides, PAHs, metals, oil & grease, TOC, grain size	Once
Calumet River	Illinois	Sediment	5 – 10 dredging	PCBs, metals, nutrients, COD, cyanide, oil & grease	Once
CUP Thornton Reservoir	Illinois	Soil	5	TCLP metals & organics	Once
CUP McCook Reservoir	Illinois	Soil	9	TCLP metals & organics	Once

g. Data Management: STORET is used by the Chicago District when the necessary time and resources are available. Mike Neeley is an authorized user of STORET. Linda Sorn has also used STORET. EPA is upgrading STORET to incorporate dedicated personal computers and annual or quarterly data uploads to the larger USEPA database. At present, graphical analyses of water and sediment quality data are performed using Windows Excel. An in-house database has been completed and is updated using Access. Sediment data is entered on Access.

h. Research Needs: The following are the short-term research needs of the District:

- Removal of ammonia from dewatering or CDF effluent discharges.
- Sediment dewatering and material rehandling for Indiana Harbor sediment in conjunction with the design of the CDF.
- Innovative dredging technology for Indiana Harbor and Canal dredging project (restricted to only those methods that produce less or the same amount of water as closed clamshell bucket dredging).

- Guidance for the characterization of aqueous wastes for manifesting and disposal purposes. Need to rectify the apparent discrepancies for analysis of aqueous waste not intended for landfill disposal.

The following are the long-term research needs of the District:

- Treatment systems of upland CDF effluent
- Sediment Quality Criteria
- Ways to recycle dredged material at or close to the dredge site.
- Economical ways of disposing of dredged material other than landfills including beneficial uses of less polluted dredge material.
- Monitoring of the Lake Michigan shoreline biological and physical habitat.

i. District Water Quality Laboratory Space: USACE, Chicago District has an interagency agreement with the U.S. Public Health Service (USPHS), Division of Federal Occupational Health in which USPHS provides support to the Chicago District in the form of basic laboratory services and a base of operations for expanded field sampling capability. This agreement has provided the Chicago District personnel with greater flexibility in sample collection, handling, preparation, storage, and shipping.

4. Water Quality Studies for GI / CG / CA Projects: Water quality activities conducted for General Investigations, Construction General, or Continuing Authorities projects during FY1998 were as follows.

a. CUP McCook Reservoir, Illinois, General Investigation. Coordinated environmental engineering work for the design of the aeration and washdown systems for the McCook Reservoir Special Reevaluation Report and EIS, and for the Aeration/Washdown Appendix of the Detailed Design Report. This work included: emission modeling; air quality dispersion modeling using SCREEN3 and the Industrial Source Complex Short Term model; screening-level health risk analyses; determination of oxygen requirements for various reservoir alternatives; awarding multiple work orders; and participating in field testing of a surface aerator for use in calibrating a three-dimensional hydrodynamic model of the reservoir. Coordinated with regulatory agencies and participated in public meeting regarding the project.

This project has a number of significant water quality and environmental studies continuing into FY 99. Combined sewage overflows are being sampled to determine the oxygen demand of water entering the deep tunnel system. Flow measurements are being collected in order to calibrate hydrologic and hydraulic models of the water shed. Water quality modules are being added to an existing three-dimensional unsteady state model to reflect water quality changes as the combined sewage moves through the tunnel.

WES is calibrating a three-dimensional hydrodynamic model to evaluate mixing within the reservoir. The District will be awarding a work order for the development of deep water diffuser tests, and for the evaluation of various mixers. A contract will be awarded for near-field modeling of bubble plumes, which will also be used for calibration of the 3-D model.

Two work orders that examine complex issues relating to aeration are being administered. These issues include potential solids accumulation, and the potential for anaerobic zones.

The above models and tests are being performed to verify both that the aeration and washdown systems will work as designed, and that the most efficient and cost-effective systems are selected.

Finalized Environmental Impact Statement.

b. CUP O'Hare Reservoir, Illinois, Construction General. In the spring and summer of 1998, oxygen transfer tests were performed for the surface aerators. In support of this effort, reviewed contractor's revised aerator testing submittals. Reanalyzed oxygen requirements and coordinated with the local sponsor. Completed background groundwater quality monitoring of the reservoir wells and nine private wells to ensure that groundwater protection system protects the aquifer and nearby potable wells.

c. Little Calumet River Flood Control Project, Indiana, Construction General. Portions of this flood control project are being designed, while other portions are under construction. Performed sampling as part of the HTRW investigation. Coordinating asbestos sampling, and the removal of above ground and underground storage tanks and septic tanks with the local sponsor and their contractor.

d. Chicago Lock. Past environmental and safety problems at the lock were evaluated and compared to the updated ERGO report.

e. Hazardous, Toxic, and Radioactive Waste (HTRW) Investigations. Reports were prepared and reviewed for the following continuing authorities studies: Des Plaines River, IL; Chicago Shoreline Reaches 2, 3, and 4, IL; borrow sources for the Chicago Shoreline Reach 4; Little Calumet River Project Stage IV Phase I, IN; North Libertyville Estates, IL; and Johns-Manville property in Waukegan, IL.

5. Water Quality Studies for O&M Projects: Water quality activities conducted for Operation and Maintenance projects during FY1998 included the following.

a. Chicago Area Confined Disposal Facility (CDF), Calumet Harbor, Illinois. In September, 1997, the frequency and sampling locations of the monitoring program was changed as described in IEPA Water Pollution Control Permit number 1997-EA-3213. The new monitoring plan uses a statistical analysis to compare water quality parameters in different sampling environments in and around the CDF. Statistical comparison is used to determine if the CDF is having an adverse impact on the surrounding water quality. Water Quality monitoring at the CDF took place in FY 98 and the annual monitoring report summarizing these sampling events will be completed in FY 99 and submitted to the permitting agencies.

b. Waukegan Approach Channel Dredging, Waukegan, Illinois. After analysis of sediment from the Approach Channel and Advanced Maintenance area, a Contaminant Determination report was completed in support of open water disposal for 1998 maintenance dredging event.

c. Indiana Harbor Treatability Study. Performance of bench-scale tests on waste streams derived from IHC sediment and site groundwater. The waste streams simulate the effluent from the CDF (pore water, CDF precipitation runoff, and groundwater from extraction wells located on the ECI property). A combination stream of the 3 elements is also being treated in the treatment train.

d. Waukegan Inner Harbor Dredging Project. Predicted effluent discharge, using modified elutriate results, settling test results, ADDAMS model or pore water concentrations, from potential CDF based on both hydraulic and mechanical dredging. Compared effluent discharge to water quality standards based on discharge to Waukegan River, Waukegan Harbor, or Lake Michigan. Developed process components needed in treatment plant in order for the effluent to meet water quality standards and prepared preliminary cost estimates for treatment plant.

e. Lake George Dredging Project. Modeled effluent discharge, using modified elutriate results, settling test results, and ADDAMS model, from a dewatering facility for sediment that is disposed of by hydraulic dredge. Compared effluent discharge to water quality standard and initiated design for treatment of ammonia. Completed appendix for draft design memorandum.

6. Other Water Quality Investigations: None

7. Research and Development: Supported the potential Des Plaines River Diversion study with respect to water quality issues.

8. Work for Others: Water quality activities performed for others in FY1998 included the following.

a. Grand Calumet River Indiana Sediment Cleanup and Remediation Alternatives Project.
For the Indiana portion of the study, the software for a sediment transport model was developed and the model is being run using different dredging scenarios. A volatilization study was done.

b. Grand Calumet River Illinois Evaluation of the Sediment Cleanup and Restoration Alternatives.
Completing the draft evaluation of alternatives for cleanup of contaminated sediment in the Illinois portion of the Grand Calumet River. Coordinating with IEPA, USEPA, and the Illinois State Geological Survey regarding sampling the Grand Calumet River in Illinois. The sampling results will be used to refine the alternatives.

ANNUAL WATER QUALITY ACTIVITY REPORT

YEAR : 1998

DISTRICT : Chicago (LRC)

Number of Water Quality Monitoring Stations

Lake/Reservoir 8 Riverine 3 Dredge/Disposal 0

Other (Groundwater, CDF pond, outfalls) 29

Number of Sediment Sampling Stations

Dredge site 16 Disposal/Reference Site 4

Not dredging related (reservoir, soil sampling) 11

WQ Staff Resources

FTEs 11 Full-time 11 Part-time 0

Water / Sediment Monitoring Contracts

	Number of work orders	Total amount ($000)
Private	12	536
University		
State/Fed		
Other Corps		
Total	12	$ 536

WQ Support /Assistance

	Support provided to district ($000)	Support provided to other ($000)
WES	$ 60	$
HEC	0	$
Other Corps	15	$
Other Agency	15	$
Total	$ 90	$

Tech Transfer Requests by District

DOTS Requests __0____ WOTS Request ___0___ WRAP*____0___
*WRAP = Wetlands Regulatory Assistance Program

List three most important Water Quality concerns/issues:

1. Timeliness of Water Quality Contracting

2. Complexity of Guidance/Regulations

3. Substantial increase in cost of completing a dredging 404(b)(1) Contaminant determination design for 404(b)(1) bioassays.